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NPIC/TDS/D-666-67
1 February 1967

MEMORANDUM FOR THE RECORD

SUBJECT: Photobleach Photography; Evaluation of Final Report Phase II

1. Photobleach studies, Phase II, was entered into with the [redacted] on 15 June 1965 for the purpose of extending the fundamental work on the reaction mechanism of the photobleach process initiated in Phase I the previous year. Other goals of Phase II were:

a. To continue studies of the relationship between the photographic properties and the operating variables to obtain use information of the material.

b. Formulation of suitable dyes and test films.

c. Demonstrate the feasibility of achieving the objectives established at the outset of Phase I.

2. The objectives established for this development under Phase I are as follows:

a. A black and white (or colorless) film, with D max of 3.0 or more over the visible region, and a D min of 0.05 or less.

b. A resolution capability of 400 line pairs/mm.

c. Speed equivalent to ASA 0.1.

d. Ability to control the H&D curve from gamma 0.8 to 2.5.

e. Stable storage of material, both before and after exposure for at least one year.

3. Early in Phase II it became obvious that several of the objectives, such as speed and D max, would not be achieved. There did however, appear to be a good possibility of achieving a photobleach material of lesser speed and maximum density. Therefore the effort was re-oriented toward a set of interim objectives of:

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a. D_{max} of at least 2.0 and a D_{min} of 0.10.

b. Resolution of at least 200 line pairs/mm.

c. Latitude of 11 steps of a 0.15 gradiation density step wedge.

d. Control of gamma from 1 to 2.

e. Storage for one year before exposure and six months after exposure, and

f. Speed sufficient to expose a 4 x 5 inch sheet in no more than 30 seconds.

4. Much of the first six months of Phase II was spent experimenting with various dye combinations in an effort to obtain a material having good D_{min} and D_{max} characteristics and capable of being heat locked to prevent deterioration. Section III of the report (Alternate systems) deals with many experiments that were made concerning such matters as; photosensitive agents, dyes, additives, polymers, and heat locking. It was not until October 1966 that a formulation, "TMI", (Trimethylindoaniline) in combination with iodoform suspended in an alcohol butrate polymer (ASB), was produced that exhibited the desirable characteristics of density, speed, latitude and locking, or keeping qualities. Therefore most of the report is devoted to extolling the qualities and possibilities of this material.

5. Much progress has been made toward meeting the above interim objectives, as shown in exhibits contained in the report, figures, 1a, 1b, 2a, 2b, and 4:

a. Figure 1a is a film sample of the photobleach material and, except for the blue color, is a fairly faithful reproduction of the original, which is shown by comparing figures 2a and 2b one of which (2b) is made from the silver halide original the other (2a) is made from the photobleach film figure 1a.

b. Figure 1b represents an initial attempt to coat paper with photobleach. It is not very good, as of now, but does indicate possibilities in this direction.

c. The resolution possibilities of the photobleach film are shown in figure 4 which resolves about 200 lines/mm.

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d. Since the writing of the report, reproductions of a gray scale have been received (the reproduction and the step wedge from which it was made are included with figure 1a). When viewed with light passed by a series OA (yellow-green) filter, it shows a latitude of about 14 shades of gray. Also, from observation of this strip under filtered light, it is reasonable to accept the D_{min} and D_{max} figures of 0.1 and 2.0 respectively as stated in the report as having been achived.

e. The heat development technique discussed in the report has provided a reasonable storage capability and the samples supplied with the report will not fade when exposed to white light. However, the development time of two minutes far exceeds the desired time of 30 seconds for each print. It is interesting to note, however, that the film is relatively insenstive to all but ultra-violet light, which is used for exposing.

f. The report shows little or no effort toward gamma control; however, the report does state that with the application of heat during the exposure there was an observed shifting of the slope of the H&D curves. The means for controlling this shift and the lower and upper limits of gamma are not presently known.

6. The recommendations for further work on photobleach cover such matters as:

a. Optimization of the latest film formulation.

b. Standardization of operational procedures.

c. Extend the investigation of contrast or gamma control.

d. Develop appropriate packaging for the sensitized material.

7. Inasmuch as the contract on this project has been terminated no action on these recommendations will be taken at this time. However, because of the great progress made on photobleach during the last few months of the contract, further investigation should be made at some future date.

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8. Because of the great difficulty anticipated in developing a black photobleach film, further effort in this direction is not recommended at this time.

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Support Systems Branch, TDS/DS, NPIC

Attachment:
Final Report on Photobleach Photography Phase II

Distribution:
Original & 1 - Route and File
1 - Originator
2 - TDS/DS

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Approved For Release 2003/04/08 : CIA-RDP78B04770A002800040001-8

To DS

[redacted]

Please recommend approval/disapproval of attached. If approved, process authorization for additional funding. Thanks

HR

2/2/66
(Date)

___	Approval	___	Per our Conversation
___	As Requested	___	Per Phone Conversation
___	Concurrence	___	Read and Pass on
___	Correction	___	Recommendation
___	Filing	___	See Me
___	Immediate Action	___	Signature
___	Initials	___	Your Comment
___	Necessary Action	___	Your Info
___	Note and Return	___	Destroy
___	Type	___	

___ Answer or Acknowledge On or Before _____

___ Prepare Reply ofr the Signature of _____

COMMENTS:

From: _____

TRANSMITTAL SLIP	DATE 24 OCT 1966
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REMARKS:

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Evaluation of contractor.

answered 10-26-66

FROM:	OL/PD/CA&SB/CAS	
ROOM NO. 1036	BUILDING Ames Building	[redacted] 25X1

FORM NO. 241 1 FEB 55 REPLACES FORM 36-8 WHICH MAY BE USED. (47)

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	CONCURRENCE		INFORMATION		SIGNATURE

Remarks:

I recently sent [redacted] a pos transparency, resolution target and Gray scale. [redacted] has also lost some time because of a strike. I believe we will get a more meaningfull report if this extention is granted.

FOLD HERE TO RETURN TO SENDER

FROM: NAME, ADDRESS AND PHONE NO.	DATE
[redacted]	10-26-66
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FORM 2-61 237

(40)

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19 October 1966

Dear Will:

In discussing the Photobleach task with Max, it appears that he could profitably use a further extension of time to about 30 November 1966 in order to complete a few more experiments and to write and produce his final report. Because the current expiration date of November 10 is so close at hand, I would appreciate getting your reaction to a further extension as soon as possible since I am sure that the normal approval channels would not be able to operate in time. In the event you do approve of this extension, I have attached a formal request addressed to the contracting officer so that you may forward it to him. Also, if you intend to approve this request, please let me know so that Max can plan accordingly.

Sincerely,

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[redacted]

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[redacted]

advised by phone 10-26-66 that we were recommending aproval of extention to nov 30, 66